IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Mattson Application No.: 10/054186 Filed: 1/22/2002 Title: Fast Recovery Method in Label Switching Networks, and Network Arrangement to Carry Out the Method Attorney Docket No.: 125-001	Group Art Unit: 2155 Examiner: Bates

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APPELLANT'S BRIEF PURSUANT TO 37 C.F.R. § 1.192

This Appellant's brief is hereby submitted in accordance with a contemporaneously filed Notice of Appeal.

I. Real Party in Interest

The real party in interest is Nortel Networks, Limited.

II. Related Appeals and Interferences

Appellants are not aware of any appeals or interferences that are related to the present case.

III. Status of the Claims

Claims 1-26 are pending in this application. All of the pending claims are rejected. None of the pending claims are allowed. This is an appeal brief from a decision by the Primary Examiner dated November 27, 2008, finally rejecting the pending claims. The rejections of claims 1-26 are the subject of this appeal.

IV. Status of Amendments

All of the submitted amendments have been entered and considered by the Examiner.

V. Summary of Claimed Subject Matter

Support for the recited limitations is in the specification and drawings as indicated below in bold type and parentheses.

1. A method of providing backup resources for a primary label switched path (LSP) in a label switching network, the primary LSP having at least a portion for transmitting data packets containing a label stack from a first label switching

node to a second label switching node, said portion including at least one intermediate label switching node between the first and second nodes **(Abstract, Figs. 1 and 2)**, the method comprising the steps of:

defining at least one backup LSP **(Backup LSP 6, Fig. 1)** starting from the first node **(MPLS Node 1, Fig. 1)** and merged with the primary LSP **(primary LSP 5, Fig. 1)** at the second node **(MPLS Node 3, Fig. 1)**, the at least one backup LSP for re-routing data packets around the at least one intermediate label switching node **(MPLS Node 2, Fig. 1)** in the event of a failure of the intermediate label switching node; **(page 5, lines 7-27; Fig. 1)**

determining a transformation of the label stack of a packet transmitted along said portion of the primary LSP from an output of the first node to an input of the second node, the transformation including label stack manipulations performed by the at least one intermediate label switching node; **(page 6, line 17 - page 7, line 22; Fig. 1)**

configuring the first node to switch a packet to the backup LSP upon detection of a failure in said portion of the primary LSP; **(page 5, lines 18-27; Fig. 1)** and

configuring at least one node of the backup LSP to process the label stack of any packet transmitted along the backup LSP to apply the same transformation to the label stack on the backup LSP as applied on said portion of the primary LSP so that the label stack received from the backup LSP at an input to the second label switching node corresponds to the label stack received from the portion of

the primary LSP at the input of the second label switching node. **(page 6, lines 17-27; Fig. 1)**

14. A label switching network including a primary label switched path (LSP) having at least a portion for transmitting data packets containing a label stack from a first label switching node to a second label switching node, said portion including at least one intermediate label switching node between the first and second nodes **(Abstract, Figs. 1 and 2)**, the network comprising:

means for defining at least one backup LSP **(Backup LSP 6, Fig. 1)** starting from the first node **(MPLS Node 1, Fig. 1)** and merged with the primary LSP **(primary LSP 5, Fig. 1)** at the second node **(MPLS Node 3, Fig. 1)**, the at least one backup LSP for re-routing data packets around the at least one intermediate label switching node **(MPLS Node 2, Fig. 1)** in the event of a failure of the at least one intermediate label switching node; **(page 5, lines 7-27; Fig. 1)**

means for determining a transformation of the label stack of a packet transmitted along said portion of the primary LSP from an output of the first node to an input of the second node, the transformation including label stack manipulations performed by the at least one intermediate label switching node; **(page 6, line 17 - page 7, line 22; Fig. 1)**

means for configuring the first node to cause said first node to switch a packet to the backup LSP upon detection of a failure in said portion of the primary LSP; **(page 5, lines 18-27; Fig. 1)** and

means for configuring a node of the backup LSP to cause said node to process the label stack of any packet transmitted along the backup LSP to apply the same transformation to the label stack in the backup LSP as that performed on the label stack of a packet transmitted along said portion of the primary LSP so that the label stack received from the backup LSP at an input to the second label switching node corresponds to the label stack received from the portion of the primary LSP at the input to the second label switching node. **(page 6, lines 17-27; Fig. 1)**

VI. Grounds of Rejection to be Reviewed on Appeal

A. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,904,018 (Lee) in view of US 7,120,151 (Ginjpalli).

VII. Argument

A. The presently claimed invention distinguishes the cited combination because the packet transformation includes label stack manipulations performed by the at least one intermediate label switching node which is bypassed.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in

judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

The use of a backup Label Switched Path (LSP) to re-route packets around a failed primary LSP is generally known.[1] However, a problem can occur when the backup LSP bypasses a Label Switched Router (LSR) from the primary LSP. While the backup LSP does not always bypass a LSR, when it does occur the label stack becomes "incorrect" from the perspective of downstream devices because the bypassed LSR does not perform an action on the packet.[2] In particular, the change in the label stack caused by (1) inaction of the bypassed LSR and (2) action by LSRs in the backup path are unexpected by the downstream devices and may be difficult or impractical to accommodate. The presently claimed invention helps solve this problem by transforming the "incorrect" label stack into a "correct" label stack such that, from the perspective of downstream devices, the packet appears to have actually traversed the bypassed LSR in the primary LSP, even though it actually did not do so. In particular, the label stack is overwritten so that indications of actions performed in the backup LSP are replaced with indications of actions that would have been done if the primary LSP had not failed and as if the bypassed LSR had not been bypassed.

With regard to the limitation of determining the label transformation, i.e., the difference between primary LSP actions and backup LSP actions, the Examiner now cites Lee at column 1, lines 27-31. The cited passage reads (in full):

[1] See Background at page 2, lines 14-27.
[2] Specification at page 2, line 28 through page 3, line 3.

> transferring the packet to the destination. Then, an intermediate LSR searches a label table from an input label of each packet and transfers the corresponding output level [sic] to the corresponding output link by swapping the corresponding output label with a new label.

What the cited passage describes is simply the normal actions performed on the label stack by LSRs in the course of routing. Please refer to the Specification at page 2, lines 1-8 for an explanation of label swapping. The recited limitation is not swapping a label in the stack, but rather transforming the label stack so that the packet no longer appears to have traversed the backup LSP, and in particular so that the packet appears to have traversed a bypassed LSR in the failed primary LSP.

In terms of claim limitations, the first distinguishing feature described above is recited in claim 1 as "determining a transformation of the label stack of a packet transmitted along said portion of the primary LSP from an output of the first node to an input of the second node, the transformation **including label stack manipulations performed by the at least one intermediate label switching node**." (emphasis added) Note that the intermediate node is the bypassed node. Similarly, claim 14 recites "means for determining a transformation of the label stack of a packet transmitted along said portion of the primary LSP from an output of the first node to an input of the second node, the transformation including label stack manipulations performed by the at least one intermediate label switching node." The "new label" described by Lee has no such properties.

With regard to the limitation of applying the label stack transformation to the packet the Examiner cites Ginjpalli at column 5, lines 30-31. The passage

cited by the Examiner references the failure shown in Figure 7 of Ginjpalli. Contrasting Figure 7 of Ginjpalli with Figure 1 of this application, note that Ginjpalli fails to contemplate the situation where an LSR (2) in the primary path is not part of the backup path. As described in the background at page 2, line 28 through page 3, line 3, it is the bypassing of the primary path LSR that causes the problem. In particular, the actions that were performed by the bypassed router in the primary LSP are not performed in the backup LSP, and the label stack becomes incorrect. Ginjpalli fails to consider this problem because Ginjpalli does not describe the scenario where a LSR is bypassed. Rather, Ginjpalli describes the scenario where only a failed link is bypassed. The presently claimed invention helps to solve the problem created by the bypassed LSR by modifying the packet so that it appears to have been process by the bypassed LSR, even though it has not been processed by the bypassed LSR.

In terms of claim limitations, the second distinguishing feature discussed above is recited in claim 1 as "configuring at least one node of the backup LSP to process the label stack of any packet transmitted along the backup LSP to apply the same transformation to the label stack on the backup LSP as applied on said portion of the primary LSP so that the label stack received from the backup LSP at an input to the second label switching node corresponds to the label stack received from the portion of the primary LSP at the input of the second label switching node." Similarly, claim 14 recites "means for configuring a node of the backup LSP to cause said node to process the label stack of any packet transmitted along the backup LSP to apply the same transformation to the label

stack in the backup LSP as that performed on the label stack of a packet transmitted along said portion of the primary LSP so that the label stack received from the backup LSP at an input to the second label switching node corresponds to the label stack received from the portion of the primary LSP at the input to the second label switching node."

In response to the previously submitted arguments the Examiner indicates that rewriting a packet label as described by Ginjipalli is equivalent to the claimed label stack transformation. The Examiner gives particular weight to the statement in Ginjipelli that LSR (115) receives the identical datagram from LSR (130) as it would receive from LSR (110). In view of the explanation provided above, it will be appreciated that the cited statement from Ginjipalli is only true because no LSR is bypassed in Ginjipalli's example, and the statement would not hold true if there were a bypassed router in the failed primary LSP rather than simply a bypassed link. The claimed transformation is not pushing and popping labels for routing purposes, but actually "correcting" the label stack by causing it to appear as it would have appeared if the bypassed LSR had actually processed the packet. Because applying the transformation mimics the actions of the bypassed LSR, the label pushing described in Ginjipalli is not equivalent to the recited limitation.

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Accordingly, claims 2-13 and 15-26 are allowable for the same reasons as claims 1 and 14.

VIII. Conclusion

Appellants submit therefore that the rejections of the present claims under 35 U.S.C. 103(a) as being unpatentable over US 6,904,018 (Lee) in view of US 7,120,151 (Ginjpalli) are improper for at least the reasons set forth above. Appellants accordingly request that the rejections be withdrawn and the case put forward for allowance.

Respectfully submitted,

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Appendix A - Claims

1. (previously presented) A method of providing backup resources for a primary label switched path (LSP) in a label switching network, the primary LSP having at least a portion for transmitting data packets containing a label stack from a first label switching node to a second label switching node, said portion including at least one intermediate label switching node between the first and second nodes, the method comprising the steps of:
defining at least one backup LSP starting from the first node and merged with the primary LSP at the second node, the at least one backup LSP for re-routing data packets around the at least one intermediate label switching node in the event of a failure of the intermediate label switching node;
determining a transformation of the label stack of a packet transmitted along said portion of the primary LSP from an output of the first node to an input of the second node, the transformation including label stack manipulations performed by the at least one intermediate label switching node;
configuring the first node to switch a packet to the backup LSP upon detection of a failure in said portion of the primary LSP; and
configuring at least one node of the backup LSP to process the label stack of any packet transmitted along the backup LSP to apply the same transformation to the label stack on the backup LSP as applied on said portion of the primary LSP so that the label stack received from the backup LSP at an input to the second label switching node corresponds to the label stack received from the portion of the primary LSP at the input of the second label switching node.

2. (previously presented) A method as claimed in claim 1, wherein the node of the backup LSP configured to apply the transformation is the first node, said transformation being applied prior to pushing a label of the backup LSP and including at least one of a label swapping and label popping manipulation.

3. (original) A method as claimed in claim 1, wherein the node of the backup LSP configured to apply the transformation is the second node.

4. (original) A method as claimed in claim 1, wherein the step of determining the transformation of the label stack comprises transmitting messages of a signaling protocol between the nodes of said portion of the primary LSP, including indications of label stack manipulations performed by said nodes on packets transmitted along the primary LSP, said indications being processed at one of the first and second nodes for deriving said transformation.

5. (original) A method as claimed in claim 1, wherein the step of determining the transformation of the label stack comprises transmitting at least one sample packet from the first node to the second node along said portion of the primary LSP.

6. (original) A method as claimed in claim 1, wherein the first node is configured to switch a packet intended for the primary LSP to the backup LSP upon detection of a failure in said portion of the primary LSP up to the intermediate node situated next to the first node.

7. (original) A method as claimed in claim 1, further comprising the steps of: defining at least one switchback LSP from an intermediate node of the primary LSP to the first node; and configuring said intermediate node to switch a packet to the switchback LSP upon detection of a failure in said portion of the primary LSP downstream of said intermediate node and up to the node situated next to said intermediate node.

8. (original) A method as claimed in claim 7, further comprising the step of configuring the first node to switch to the backup LSP any packet received on the switchback LSP.

9. (original) A method as claimed in claim 8, further comprising the steps of: determining a second transformation of the label stack as the inverse of a transformation of the label stack of a packet transmitted along said portion of the primary LSP from the output of the

first node to said intermediate node; and configuring at least one node of the switchback LSP to process the label stack of any packet transmitted from said intermediate node along the switchback LSP so as to apply said second transformation.

10. (original) A method as claimed in claim 9, wherein the node of the switchback LSP configured to apply the second transformation is said intermediate node, the second transformation being applied prior to pushing a label of the switchback LSP.

11. (original) A method as claimed in claim 10, wherein the primary LSP has at least one additional intermediate node between the first node and said intermediate node, wherein the switchback LSP is defined to comprise the nodes of the primary LSP, in a reverse direction, from said intermediate node to the first node.

12. (original) A method as claimed in claim 11, further comprising the step of configuring said additional intermediate node to switch a packet to the switchback LSP upon detection of a failure in said portion of the primary LSP downstream of said additional intermediate node and up to the node situated next to said additional intermediate node.

13. (original) A method as claimed in claim 12, further comprising the steps of: determining a third transformation of the label stack as the inverse of a transformation of the label stack of a packet transmitted along said portion of the primary LSP from the output of the first node to said additional intermediate node; and configuring said additional intermediate node to process the label stack of any packet that it switches to the switchback LSP so as to apply said inverse transformation prior to pushing a label of the switchback LSP.

14. (previously presented) A label switching network including a primary label switched path (LSP) having at least a portion for transmitting data packets containing a label stack from a first label switching node to a second label switching node, said portion including

at least one intermediate label switching node between the first and second nodes, the network comprising:

means for defining at least one backup LSP starting from the first node and merged with the primary LSP at the second node , the at least one backup LSP for re-routing data packets around the at least one intermediate label switching node in the event of a failure of the at least one intermediate label switching node;

means for determining a transformation of the label stack of a packet transmitted along said portion of the primary LSP from an output of the first node to an input of the second node, the transformation including label stack manipulations performed by the at least one intermediate label switching node;

means for configuring the first node to cause said first node to switch a packet to the backup LSP upon detection of a failure in said portion of the primary LSP; and

means for configuring a node of the backup LSP to cause said node to process the label stack of any packet transmitted along the backup LSP to apply the same transformation to the label stack in the backup LSP as that performed on the label stack of a packet transmitted along said portion of the primary LSP so that the label stack received from the backup LSP at an input to the second label switching node corresponds to the label stack received from the portion of the primary LSP at the input to the second label switching node.

15. (previously presented) A label switching network as claimed in claim 14, wherein the node of the backup LSP configured to apply the transformation is the first node, said transformation being applied prior to pushing a label of the backup LSP and including at least one of a label swapping and label popping manipulation.

16. (original) A label switching network as claimed in claim 14, wherein the node of the backup LSP configured to apply the transformation is the second node.

17. (original) A label switching network as claimed in claim 14, wherein the means for determining the transformation of the label stack comprise means for transmitting messages of a signaling protocol between the nodes of said portion of the primary LSP,

including indications of label stack manipulations performed by said nodes on packets transmitted along the primary LSP, and processing means for processing said indications at one of the first and second nodes for deriving said transformation.

18. (original) A label switching network as claimed in claim 14, wherein the means for determining the transformation of the label stack comprise means for transmitting at least one sample packet from the first node to the second node along said portion of the primary LSP.

19. (original) A label switching network as claimed in claim 14, wherein the first node is configured to switch a packet intended for the primary LSP to the backup LSP upon detection of a failure in said portion of the primary LSP up to the intermediate node situated next to the first node.

20. (original) A label switching network as claimed in claim 14, further comprising: means for defining at least one switchback LSP from an intermediate node of the primary LSP to the first node; and means for configuring said intermediate node to cause said intermediate node to switch a packet to the switchback LSP upon detection of a failure in said portion of the primary LSP downstream of said intermediate node and up to the node situated next to said intermediate node.

21. (original) A label switching network as claimed in claim 20, further comprising means for configuring the first node to cause said first node to switch to the backup LSP any packet received on the switchback LSP.

22. (original) A label switching network as claimed in claim 20, further comprising: means for determining a second transformation of the label stack as the inverse of a transformation of the label stack of a packet transmitted along said portion of the primary LSP from the output of the first node to said intermediate node; and means for configuring a node of the switchback LSP to cause said node to process the label stack of any packet transmitted from said intermediate node along the switchback LSP so as to

apply said second transformation.

23. (original) A label switching network as claimed in claim 22, wherein the node of the switchback LSP configured to apply the second transformation is said intermediate node, the second transformation being applied prior to pushing a label of the switchback LSP.

24. (original) A label switching network as claimed in claim 23, wherein the primary LSP has at least one additional intermediate node between the first node and said intermediate node, wherein the switchback LSP is defined to comprise the nodes of the primary LSP, in a reverse direction, from said intermediate node to the first node.

25. (original) A label switching network as claimed in claim 24, further comprising means for configuring said additional intermediate node to cause said additional intermediate node to switch a packet to the switchback LSP upon detection of a failure in said portion of the primary LSP downstream of said additional intermediate node and up to the node situated next to said additional intermediate node.

26. (original) A label switching network as claimed in claim 25, further comprising: means for determining a third transformation of the label stack as the inverse of a transformation of the label stack of a packet transmitted along said portion of the primary LSP from the output of the first node to said additional intermediate node; and means for configuring said additional intermediate node to cause said additional intermediate node to process the label stack of any packet that it switches to the switchback LSP so as to apply said inverse transformation prior to pushing a label of the switchback LSP.

Appendix B - Evidence Submitted

None.

Appendix C - Related Proceedings

None.